

IN THE CLAIMS:

Please enter the claims as follows:

1. (Previously Presented) A tubing expansion device comprising:
at least one expansion member adapted to expand a tubing by inducing a hoop stress in the tubing; and
at least one further expansion member adapted to expand the tubing by inducing a compressive yield of the tubing, wherein one of said at least one expansion member and said at least one further expansion member is adapted to expand the tubing to a first diameter and the other of said at least one expansion member and said at least one further expansion member is adapted to further expand the tubing to a larger second diameter, wherein the device is arranged such that expansion of the tubing to a desired final diameter is carried out using the hoop stress inducing expansion member.
2. (Original) A tubing expansion device as claimed in claim 1, wherein the expansion device is adapted to be rotated and translated through tubing to be expanded.
3. (Original) A tubing expansion device as claimed in claim 1, wherein the expansion device is adapted to be advanced through tubing to be expanded without rotation.
- 4.-5. (Cancelled)
6. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress and compressive yield inducing expansion members are axially spaced.
7. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress and compressive yield inducing expansion members are circumferentially spaced.

8. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress and compressive yield inducing expansion members are arranged according to at least one parameter of a tubing to be expanded.

9. (Original) A tubing expansion device as claimed in claim 8, wherein the parameter is selected from the group comprising: a pre-expansion diameter of the tubing; a pre-expansion wall thickness of the tubing; a desired post expansion diameter of the tubing; a desired post expansion wall thickness of the tubing; a pre-expansion strength of the tubing; Young's Modulus of the tubing material; anticipated work hardening of the tubing during expansion; a desired post-expansion strength of the tubing; and an axial length of the tubing post-expansion.

10. (Original) A tubing expansion device as claimed in claim 1, wherein the expansion members are provided spaced alternately in an axial direction.

11. (Original) A tubing expansion device as claimed in claim 1, wherein the expansion members are provided spaced alternately in a circumferential direction.

12. (Original) A tubing expansion device as claimed in claim 1, wherein said hoop stress and compressive yield inducing expansion members are provided on respective separate portions coupled together to form the expansion device.

13. (Original) A tubing expansion device as claimed in claim 12, wherein the expansion device further comprises a hoop stress inducing expansion tool and a compressive yield inducing expansion tool, each carrying said respective hoop stress and compressive yield inducing expansion members.

14. (Original) A tubing expansion device as claimed in claim 12, wherein the portions are coupled together and restrained against relative rotation.

15. (Original) A tubing expansion device as claimed in claim 12, wherein at least one of said portions is rotatable relative to at least one other portion.
16. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member is adapted to contact the tubing over a majority of a circumference of the tubing.
17. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is adapted to contact the tubing over part of a circumference of the tubing.
18. (Original) A tubing expansion device as claimed in claim 17, wherein the compressive yield inducing expansion member is adapted to contact the tubing in a point contact.
19. (Original) A tubing expansion device as claimed in claim 17, wherein the compressive yield inducing expansion member is adapted to contact the tubing in a line contact.
20. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a plurality of hoop stress inducing expansion members.
21. (Withdrawn) A tubing expansion device as claimed in claim 20, wherein said hoop stress inducing expansion members describe progressively increasing expansion diameters in a direction along an axial length of the device.
22. (Original) A tubing expansion device as claimed in claim 1, comprising a plurality of compressive yield inducing expansion members.

23. (Original) A tubing expansion device as claimed in claim 22, wherein said compressive yield inducing expansion members are arranged to describe progressively increasing expansion diameters in a direction along an axial length of the device.

24. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a plurality of hoop stress inducing expansion portions each having at least one hoop stress inducing expansion member.

25. (Original) A tubing expansion device as claimed in claim 1, comprising a plurality of compressive yield inducing expansion portions each having at least one compressive yield inducing expansion member.

26. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a plurality of hoop stress inducing expansion portions each having at least one hoop stress inducing expansion member, and a plurality of compressive yield inducing expansion portions each having at least one compressive yield inducing expansion member, said hoop stress and compressive yield inducing expansion portions axially alternating along a length of the device.

27. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a plurality of hoop stress inducing expansion portions each having at least one hoop stress inducing expansion member, and a plurality of compressive yield inducing expansion portions each having at least one compressive yield inducing expansion member, wherein a plurality of said hoop stress inducing expansion portions are coupled together and joined to at least one compressive yield inducing expansion portion.

28. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a plurality of hoop stress inducing expansion portions each having at least one hoop stress inducing expansion member, and a plurality of compressive yield inducing expansion portions each having at least one compressive yield inducing expansion

member, wherein a plurality of said compressive yield inducing expansion portions are coupled together and joined to at least one hoop stress inducing expansion portion.

29. (Original) A tubing expansion device as claimed in claim 1, comprising at least one hoop stress inducing expansion member and at least one compressive yield inducing expansion member provided on a single portion of the device.

30. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member comprises a fixed expansion member.

31. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member is fixed relative to a remainder of the device.

32. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member is formed integrally with a body of the expansion device.

33. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member is rotatable with respect to the tubing.

34. (Original) A tubing expansion device as claimed in claim 33, wherein the hoop stress inducing expansion member is rotatably mounted on a body of the device.

35. (Original) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member comprises a fixed diameter expansion member.

36. (Cancelled)

37. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member comprises a compliant expansion member, wherein

the compliant expansion member is radially moveable inwardly in order to a position having a smaller diameter.

38. (Withdrawn) A tubing expansion device as claimed in claim 37, wherein the compliant expansion member comprises a compliant cone.

39. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a hoop stress inducing expansion tool including a plurality of hoop stress inducing expansion rollers mounted for rotation about an axis substantially perpendicular to an axis of the tool.

40. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a cone with a plurality of hoop stress inducing expansion rollers rotatably mounted on the cone.

41. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the hoop stress inducing expansion member takes the form of a collapsible expansion cone which is movable between a collapse position and an expansion position, in the expansion position, the cone adapted for expanding the tubing.

42. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member comprises a rotary expansion member, which is rotatable about an expansion member axis.

43. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is provided as part of a compressive yield inducing expansion member module releasably coupled to a body of the device as a unit.

44. (Original) A tubing expansion device as claimed in claim 43, wherein the compressive yield inducing expansion member is rotatably mounted on a spindle.

45. (Previously Presented) A tubing expansion device, comprising:
at least one expansion member adapted to expand a tubing by inducing a hoop stress in the tubing; and
at least one further expansion member adapted to expand the tubing by inducing a compressive yield of the tubing, wherein one of said at least one expansion member and said at least one further expansion member is adapted to expand the tubing to a first diameter and the other of said at least one expansion member and said at least one further expansion member is adapted to further expand the tubing to a larger second diameter, wherein the compressive yield inducing expansion member is provided as part of a compressive yield inducing expansion member module releasably coupled to a body of the device as a unit, wherein the compressive yield inducing expansion member is rotatably mounted on a spindle, wherein the spindle is cantilevered and extends from a body of the device.
46. (Withdrawn) A tubing expansion device as claimed in claim 44, wherein the spindle is pivotally coupled to the body.
47. (Withdrawn) A tubing expansion device as claimed in claim 44, wherein an axis of the spindle is disposed at an angle with respect to a main axis of the device.
48. (Withdrawn) A tubing expansion device as claimed in claim 1, comprising a bearing between the compressive yield inducing expansion member and a body of the device, and a sealed lubrication system for containing lubricant to facilitate rotation of the compressive yield inducing expansion member relative to the body.
49. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is radially moveably mounted with respect to a body of the device, for movement towards an expansion configuration describing an expansion diameter for expanding tubing to a predetermined diameter.

50. (Withdrawn) A tubing expansion device as claimed in claim 49, wherein the compressive yield inducing expansion member is lockable in the extended configuration.

51. (Withdrawn) A tubing expansion device as claimed in claim 49, wherein the compressive yield inducing expansion member is biased radially inwardly.

52. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is moveable in response to applied fluid pressure.

53. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is moveable in response to an applied mechanical force.

54. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is radially moveable relative to a body of the device in response to both: a) an applied mechanical force; and b) an applied fluid pressure force.

55. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is pivotally mounted with respect to a body of the device for movement towards an extended configuration.

56. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is adapted to generate a drive force on the tubing for at least partly translating the device with respect to the tubing.

57. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein the drive force is generated on rotation of the expansion device.

58. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein the expansion device is adapted to be translated through the tubing by a combination of an external axial force and the generated drive force.

59. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein the expansion device is adapted to be translated through the tubing without an externally applied axial force.

60. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein an axis of the compressive yield expansion member is skewed with respect to a body of the device.

61. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein the device comprises a plurality of compressive yield inducing expansion members, and wherein the members are circumferentially spaced and helically oriented with respect to a body of the device.

62. (Withdrawn) A tubing expansion device as claimed in claim 56, wherein the compressive yield inducing expansion member includes a gripping surface for gripping the tubing to impart a drive force on the tubing.

63. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is adapted to expand the tubing by less than 50% of the total expansion of the tubing.

64. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is adapted to expand the tubing by less than 25% of the total expansion of the tubing.

65. (Original) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member is adapted to expand the tubing by less than 10% of the total expansion of the tubing.

66. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein at least one of the hoop stress inducing and compressive yield inducing expansion members has an expansion member axis, and wherein said axis is non-parallel with respect to a main axis of the device.

67. (Withdrawn) A tubing expansion device as claimed in claim 1, wherein the compressive yield inducing expansion member comprises a rotary expansion member, which is rotatable about an expansion member axis, and wherein said axis is non-parallel with respect to a main axis of the device.

68. (Withdrawn) A tubing expansion device as claimed in claim 67, wherein said expansion member axis converges with the tool main axis towards a leading end of the device.

69. (Withdrawn) A tubing expansion device as claimed in claim 67, wherein the compressive yield inducing expansion member is rotatably mounted on a spindle, and wherein the spindle is disposed non-parallel with respect to the device main axis.

70. (Withdrawn) A tubing expansion device as claimed in claim 67, wherein the compressive yield inducing expansion member includes a spindle which is rotatable relative to a body of the device, and wherein the spindle is disposed non-parallel with respect to the device main axis.

71-97. (Cancelled).

98. (Previously Presented) The tubing expansion device of claim 100, wherein the expansion cone engages an inner wall of the tubular around a majority of the inner diameter in order to expand the tubing.

99. (Previously Presented) The tubing expansion device of claim 1, wherein the at least one expansion member is adapted to expand the tubing by solely inducing a hoop stress in the tubing.

100. (Previously Presented) A tubing expansion device comprising:

at least one expansion member adapted to expand a tubing by inducing a hoop stress in the tubing, wherein the hoop stress inducing expansion member comprises an expansion cone; and

at least one further expansion member adapted to expand the tubing by inducing a compressive yield of the tubing, wherein one of said at least one expansion member and said at least one further expansion member is adapted to expand the tubing to a first diameter and the other of said at least one expansion member and said at least one further expansion member is adapted to further expand the tubing to a larger second diameter, wherein the device is arranged such that expansion of the tubing to a desired final diameter is carried out using the hoop stress inducing expansion member.